

APPENDIX H - PHOSPHORUS INDEX

The Phosphorus Index has been developed to assist field staff, watershed planners, and land users in evaluating various land forms and management practices for potential risk of nitrogen and phosphorus movement to water bodies. The site rating of the Phosphorus Index (i.e., low, medium, high, very high) identifies sites where the risk of phosphorus movement may be relatively high when compared to other sites.



The material contained in this appendix should be used for your informational purposes only. Specific phosphorus index calculations should be done by NRCS, your local extension, or a certified nutrient management planner.

Description

The Phosphorus Index (PI) is a simple assessment tool that examines the potential risk of phosphorus movement to waterbodies based on various landforms and management practices. The PI identifies sites where the risk of phosphorus movement may be relatively higher or lower than other sites. It considers soil erosion rate, runoff, available phosphorus soil test levels, fertilizer and organic phosphorus application rates, and methods to assess the degree of vulnerability of phosphorus movement from the site. A weighting procedure includes the various contributions each site characteristic may have.

Instructions for Calculating Your Phosphorus Index

The PI uses eight characteristics, as presented in the following table, to obtain an overall rating for a site. Each characteristic is assigned an interpretive rating with a corresponding numerical value: LOW (1), MEDIUM (2), HIGH (4), or VERY HIGH (8), based on the relationship between the characteristic and the potential for phosphorus loss from a site. Suggested ranges appropriate to each rating for a site characteristic are then assigned. Each of the characteristics in the PI has also been given a weighting factor that reflects its relative importance to phosphorus loss. For example, erosion (weighting factor = 1.5) is generally more important to phosphorus loss than phosphorus fertilizer application method (weighting factor = 0.5). The weighting factors used are currently based on the professional judgment of the scientists that developed the PI; they are not derived directly from field research with the PI. Contact your state or local conservation agency for modified weighting factors, which are based on local soil properties, hydrologic conditions, and agricultural management practices.

Site Characteristic (weighting factor)	Phosphorus Loss Rating (value)				
	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)
Soil erosion (1.5)	Not applicable	<5 tons/acre	5-10 tons/acre	10-15 tons/acre	>15 tons/acre
Irrigation erosion (1.5)	Not applicable	Infrequent irrigation on well-drained soils	Moderate irrigation on soils with slopes < 5%	Frequent irrigation on soils with slopes of 2-5%	Frequent irrigation on soils with slopes > 5%
Soil runoff class (0.5)	Not applicable	Very low or low	Medium	High	Very high
Soil test P (1.0)	Not applicable	Low	Medium	High	Excessive
P fertilizer rate (lb P ₂ O ₅ /acre) (0.75)	None applied	<31	31-90	91-150	>150
P fertilizer application method (0.5)	None applied	Placed with planter deeper than 5 cm	Incorporate immediately before crop	Incorporate > 3 months before crop or surface applied < 3 months before crop	Surface applied > 3 months before crop
Organic P source application rate (lb P ₂ O ₅ /acre) (1.0)	None applied	<31	31-90	91-150	>150
Organic P source application method (1.0)	None	Placed with planter deeper than 5 cm	Incorporate immediately before crop	Incorporate > 3 months before crop or surface applied < 3 months before crop	Surface applied > 3 months before crop

Source: Soil Testing for Phosphorus, USDA, April 1998.

For each of the eight characteristics, multiply the characteristic weighting factor by your phosphorus loss rating value, and sum the totals. For example, if your soil erosion is medium and your irrigation erosion is high, then your overall site characteristic score for soil erosion is 3 (1.5 * 3) and for irrigation erosion is 6 (1.5 * 4). Calculate your site characteristic score for the remaining six characteristics and the sum them (i.e., 3 + 6 + remaining scores).

This sum total is your phosphorus index for your site. Use the table below as guide to your phosphorus index.

Phosphorus Index for Site	Generalized Interpretation of Phosphorus Index for Site
<8	LOW potential for P movement from the site. If farming practices are maintained at the current level, the probability of an adverse impact to surface waters from P losses at this site is low.
8 - 14	MEDIUM potential for P movement from the site. The chance for an adverse impact to surface waters exists. Some remedial action should be taken to lessen the probability of P loss.
15 - 32	HIGH potential for P movement from the site and for an adverse impact on surface waters to occur unless remedial action is taken. Soil and water conservation as well as P management practices are necessary to reduce the risk of P movement and water quality degradation.
> 32	VERY HIGH potential for P movement from the site and for an adverse impact on surface waters. Remedial action is required to reduce the risk of P loss. All necessary soil and water conservation practices, plus a P management plan, must be put in place to avoid the potential for water quality degradation.

Source: Soil Testing for Phosphorus, USDA, April 1998.

References

USDA/NRCS Field Office Technical Guide.
 Core4 Conservation Practices, August 1999.
 U.S. Department of Agriculture. Soil Testing for Phosphorus, April 1998.

Who to Contact for More Information

Your Local Cooperative Cooperative Extension Office
 Your Local Land Grant University
 National Water Management Center/Natural Resources Conservation Service (USDA)